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In the latest United States Dept. of Agriculture Bulletin on the Periodical Cicada, Mr. Marlatt says that "an instance of a few weeks acceleration under out door conditions is given by Mr. Schwarz. Commenting on the slightly early emergence of individuals of Brood XIV near Harper's Ferry, W. Va., in 1889, in a small clearing surrounded by woods, Mr. Schwartz urges that a clearing made in the midst of a dense forest forms a natural hot house, the soil securing in such places much more warmth than in the shady woods. That the cicadas should appear a little earlier in such situations is not remarkable, and he suggests also that under favorable circumstances the cicadas might develop on such cleared places one or more years in advance of the normal time, and that these precursors, if numerous enough, would be able to form a new brood."

In the Long Island locality they were certainly numerous enough to lay a great many eggs, and may possibly establish a new brood. Brood No. 1 (1910) is not recorded from the states of New Jersey or New York, but occurs more to the south and southwest, whereas Brood No. 2 (1911) is well known in New Jersey, Staten Island and part of Long Island.

It may be that the cicadas that appeared this year on a limited area in the Half Way Hollow Hills, would not have come from the ground until June, 1911, if the timber had not been recently removed.

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## ENTYLIA GERMAR AND ITS DIFFERENT FORMS.

BY IGNAZ MATAUSCH,

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(With Plate VII.)

Through the kindness of Prof. W. M. Wheeler I have come into possession of a great number of specimens of *Entylia sinuata*—705 altogether, including 119 nymphs and 12 nymphal exuviae—with the data of capture. This material has enabled me to study the insect in nearly all of its phases and color variations.

The following are the data given me by Professor Wheeler: "The *Entylia sinuata*, which I send you, were all taken September 3 to 6, 1910, at Colebrook, Litchfield County, Conn., on the lower sur-

faces of the leaves of *Eupatorium purpureum* L. None was found on the coarse variety of this plant known as *maculatum* L., which is very common in the same localities. The adult Membracids were resting in two rows, the individuals alternating on each side of the mid-rib of the leaf, usually with their heads directed towards the apex of the leaf. The young specimens were often more irregularly arranged. Each leaf seemed to be infested with a single colony, all the members of which, though variable, usually presented a strong family resemblance and differed more or less from the colonies on other leaves. Nevertheless, there were sometimes considerable

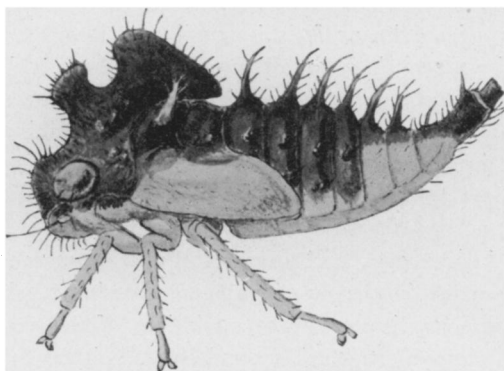


FIG. 1. *Entylia sinuata* Fab., nymph.

variations in form and color in the same family. The insects seem to have started out on the lower leaves of the plant, which were often quite brown and withered, and then to have moved to higher leaves for a fresh supply of sap. Some of the plants had been seriously injured. In some localities both the young and adult *Entylia* were being attended by the following ants: *Tapinoma sessile* Say, *Lasius niger* L. var. *americanus* Emery, *Formica fusca* L. var. *subsericea* Say and *Myrmica brevinodis* Emery var. *canadensis* Wheeler."

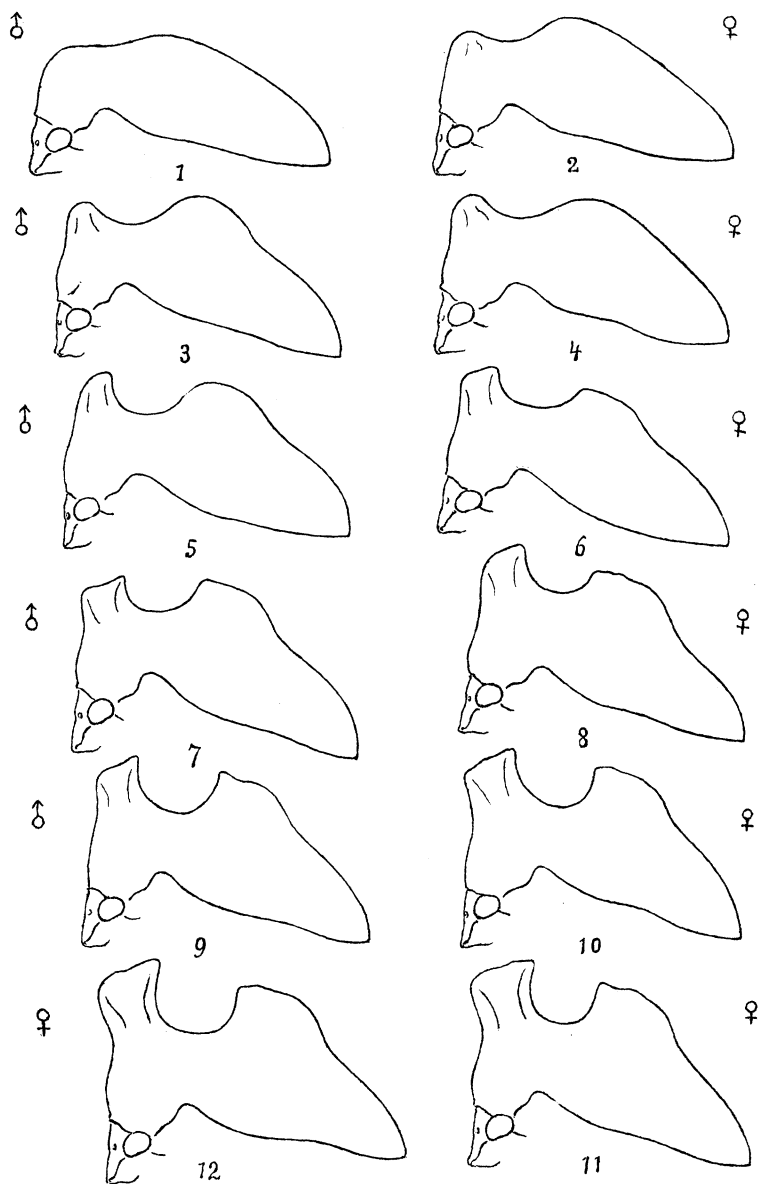
Comparing the specimens with Van Duzee's Fig. 1-6, Pl. I, in his studies on North American Membracidae, and the figures of *Entylia sinuata* var. *mira* Butl. in the *Biologia Centr. Amer.*, Vol. II, Figs. 12-12a, I find that the specimens from Colebrook, Conn., represent all of these forms and also the beautiful color variety

*Publilia concava* Say var. *nigridorsum* Godg., but *P. reticulata* Van D. is not among them although it is also, in all probability, merely a variety of *Entylia*.

As shown in the Figs. 1-12 on plate VII the variations represent a graded series from *Publilia* Stål to *Entylia concisa* Walk. with the most gradual transitional forms. These forms represent more or less completely the various "specific" forms. Besides the forms represented in the figures I found a single male in which the anterior thoracic prominence is completely lacking, but as this insect seems to be malformed I have not drawn it and have represented only the forms which occur most abundantly in the series. Owing to the large number of specimens it is impossible to describe all the different variations, especially as all conceivable shades of the ground coloration and pattern occur. Occasionally, however, a single specimen is unique in the series by reason of its striking individual pattern. On the other hand, there are groups of specimens each presenting a single type but varying, especially in the ground color, within rather narrow limits. Thus, *e. g.*, there are *Entylia-Publilia*-forms which have a gray or brown color mottled more or less with yellow, white, dark brown or black. Among the *E. sinuata*-forms there are, with sporadic exceptions, variations of the various yellow, brown, reddish brown and black ground colors, with yellow, light and dark brown, black and white markings.

That the insect also occurs on other plants besides *Eupatorium purpureum* is shown by the following data: Prof. Wheeler collected on July 7, 1908, at South Harpswell, Me., 20 females and one male of the *Entylia-Publilia*-form, together with numerous eggs on *Solidago*. Mr. William Reiff took numerous specimens of the same form together with many nymphs on September 7, 1909, at Forest Hills, Mass., on the same plant. Prof. Otto Lügger, in the "Sixth Annual Report of the Entomologist of the State Experiment Station of the University of Minnesota" (1900) says that *Entylia sinuata* occurs "on a variety of plants and it is somewhat partial to sun-flowers."

The nymphs of the series collected by Prof. Wheeler, in comparison with those taken last year by Mr. Reiff, have a somewhat more prominent thorax; in other respects they are identical. Color variations were found only in the fully grown nymphs, and these variations, of course, foreshadow those of the adult insect. The text-figure 1 represents a full-grown nymph.



*Entylia sinuata* Fab.

In the series of Connecticut specimens the females predominated somewhat over the males; 7 per cent. of them were of the different *Publilia*-forms including the transition form shown in Fig. 4, which, moreover, seems to be very close to *P. porrecta* Fowl.

I have in my collection in addition to the *Entylia-Publilia*-forms a fine pair from Prof. J. B. Smith. This was taken in Jamesburg, N. J., and stands between *E. concisa* Walker and *E. sinuata* var. *mira* Butl. From Mr. William Beutenmueller I have received a female which is somewhat more like the *concisa*-form. It was collected in June in the Black Mts., N. C. Mr. William T. Davis has given me four females of the *concisa* form collected in Alexandria Co., Va., June 14, 1907. A male taken by Mr. Ch. Olsen in Staten Island, N. Y., Aug. 16, 1908, belongs to *E. bactriana* Germ. and another male of the same form was taken by Mr. H. Mueller in the Bronx, N. Y., and I have myself taken a male of the same size and more like the female *bactriana* in Queens, Long Island. I have received from the firm Staudinger & Bang-Haas several specimens taken in Rio Grande do Sul, Brazil, together with a specimen from Peru. The females in this series vary among themselves, but they differ from the northern forms in the shape of the anterior thoracic prominence which is strongly directed anteriorly and in the much lower posterior thoracic prominence. The single male, which I have represented in Fig. No. 3, is undoubtedly a southern variety.

Reference to the literature shows that the Membracid I have been considering is distributed over the whole American continent from Canada, through the United States and Central America to South America.

The great variation in the series from Connecticut is very interesting because all the specimens were taken at the same time, on the same species of plant and in a very restricted area. It would seem therefore that the variation could hardly be attributed to the effects of external conditions. Owing to its remarkable variability *E. sinuata*, which has been known since 1771, has been described under no less than 21 different names.